Wachusett Reservoir Watershed Land Management Plan: 2001-2010

Metropolitan District Commission / Division of Watershed Management

- Executive Summary -

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The Metropolitan District Commission's Division of Watershed Management (MDC/DWM) has developed a 10-year Wachusett Watershed Land Management Plan that sets out principles, goals, and objectives for managing MDC owned land with the express purpose of protecting the public water supply. In addition, the plan describes MDC's land acquisition program within the Wachusett Watershed to increase the protection of the reservoir, as well as objectives for managing wildlife and protecting cultural resources. Note that this plan is distinct from other MDC/DWM plans, such as the Public Access Plan (recreation) and the Watershed Protection Plan (private and public land source water protection).

The following is a summary of the seven sections of the plan including background information, policies and program descriptions.

I. Introduction, Mandates and Statement of Mission

Contents: This section presents the legislative mandates, agency mission statements, and other foundations for MDC's land management program, as well as a general overview of the plan.

Key Points: Chapter 372 (Acts of 1984) provides the primary legislative mandate for MDC's land management activity. Chapter 372 established the Division of Watershed Management and directed it to "…utilize and conserve…water and other natural resources in order to protect, preserve and enhance the environment of the Commonwealth and to assure the availability of pure water for future generations." This statute sets forth clear authority for the active management of the watershed and its natural resources. Chapter 372 directs the MDC/DWM to periodically prepare watershed management plans for "…forestry, water yield enhancement and recreational activities."

The plan calls for the maintenance of a diverse, multi-layered forest cover on much of the watershed. The plan primarily focuses on management over the next ten years, but it also projects the forest cover and watershed conditions 60 years into the future. This plan should be viewed as an "adaptive watershed management plan" to be applied but updated and modified as new properties are added and new information comes to light.

A significant difference between the Quabbin Watershed and the Wachusett Watershed is the more common interface between MDC lands and private properties in the Wachusett Watershed.

II. Description of Wachusett Watershed Resources

Contents: This section gives an overview of the natural and cultural resources contained within MDC/DWM watershed lands surrounding Wachusett Reservoir.

Key Points: The MDC controls approximately 26% of the 71,000 acres in the Wachusett watershed system including land and water. Privately owned forestland comprises 37.3 % (26, 392 acres) of the watershed. Of the land controlled by the MDC, approximately 12,500 acres are forested, while 1640 acres are wetland areas and about 1000 acres are non-forested open space.

Wachusett soils are of glacial origin, range from poorly to excessively well drained, and generally have low to moderate erosion potential.

Quabbin Reservoir transfers account for over 50% of the average annual Wachusett inflow. Inflows from the Wachusett's main tributaries, the Stillwater and Quinapoxet Rivers account for another 30% of the average annual inflow.

Forested land accounted for about 43% of the initial acreage taken (1,475 of 3,380 acres) at the time the reservoir was being built. The idea of forests as a source of high quality water was becoming ever more accepted at this time and approximately 1,000 acres of tree plantations were established, with conifers comprising about 78% of all trees planted. The top five species (listed by basal area) on MDC lands are white pine, red maple, red oak, black oak, and white oak. Within the Wachusett forest, oak cover types make up 49 % of the forest.

Overall, Wachusett supports a variety and abundance of wildlife species. MDC forests provide habitat for a diversity of birds and mammals including white-tailed deer, turkey, grouse, beaver, raccoons, and fisher. The Wachusett Reservoir supports many water-based species including common loons, spotted sandpipers and bald eagles. The watershed harbors a variety of rare wildlife species and habitats. A total of 11 vertebrate state listed wildlife species are known to occur on the watershed, and most occurrences have been on MDC land.

Cultural resources on the Wachusett include both historic and prehistoric sites. Currently there are a total of twenty-seven recorded prehistoric Native American sites within, or in close proximity to the Wachusett watershed. MDC has excellent records of historic cultural resources, and a complete inventory of these sites, similar to that which has been completed at Quabbin, is a long term objective for Wachusett properties. A number of existing properties have been designated or declared eligible for the National Register of Historic Places.

III. Research based Principles Guiding Watershed Management

Contents: The purpose of this section is to identify various principles of watershed management that form the basis for the specific goals and implementation objectives for management of the Wachusett watershed lands during the period covered by the plan. These principles were distilled from the comprehensive literature review included in the Supporting Appendices for this plan, which summarizes the findings from approximately 350 watershed, forestry, and wildlife management papers that were reviewed by MDC/DWM staff.

Key Points: The central principle of watershed protection is the importance of maintaining forested, undeveloped cover across most of the watershed. Control of human activities, maintenance of roads (to prevent erosion while allowing access), and careful attention to riparian zones and wetlands follow as important watershed protection principles.

While some components of water yields are not controllable (e.g., precipitation, soil characteristics, topography), changes in vegetative cover, through management or natural disturbance, can have significant effects. Generally, as forest cover increases, water yields decrease.

Watershed forests can be managed in a way that provides significant benefits to long-term water quality protection, while minimizing adverse impacts during management operations. Forest management can deliberately restructure the forest so that it is better able to resist, and recover from, the impacts of severe natural disturbances. By maintaining a component of young forest throughout the watershed, this restructuring can provide both rapid recovery from disturbance and aggressive uptake of nutrients.

Among the principles described under the topic of Air Pollution is that forests function as "sinks" for airborne pollutants, mitigating their impacts. While this may benefit water quality protection, tree survival is affected by air pollution damage. Maintaining diverse and vigorous forests may mitigate this damage. Nitrogen saturation (in which nitrogen inputs from air pollutants exceed the assimilative capacity of the system) is of increasing concern in watershed forests, since it can lead to nitrate losses to streams. Again, forests that are actively accumulating biomass can mitigate these effects through increased assimilation.

Wildlife populations can have significant impacts on both habitat and water quality conditions. Land management practices that change habitat conditions will result in changes in the wildlife community.

IV. Watershed Management Goals

Contents: Based upon the principles distilled from the literature and local research, the experiences of MDC/DWM staff in managing watersheds, and the mandates from the laws and regulations that govern MDC land management, this section details MDC goals for overall Watershed Management, Water Quality and Yields, Land Protection, Forest Management, Wildlife Management, and Cultural Resource Protection.

Key Points: The primary goal of the MDC/DWM is to maintain high quality source water for present and future generations. The MDC/DWM strives to continually meet the Massachusetts Surface Water Quality Standards for Class A waters and regulations for source water quality resulting from the US EPA safe drinking water act. Secondary water quality goals include reducing/controlling nutrient inputs to the reservoirs, reducing the risk of a hazardous material spill and controlling general pollutant transport into the reservoir.

While water yield has been a concern in past years, the MWRA has devoted considerable efforts to Demand Management, and consequently the overall system demand has significantly decreased, therefore, water quality rather than water yield considerations are currently driving management decisions.

Land protection goals on MDC/DWM lands include working to limit land uses on the watershed to those that do not threaten water quality and to provide control over non-forest land use (e.g. roads), the effects of natural events (e.g. fire), and human activities that threaten water or other natural resources. Land protection goals for non-MDC lands include active encouragement of private landowners to be responsible stewards, work with other land protection entities to ensure watershed protection, and the purchase of conservation restrictions on lands that meet the criteria for protection.

Forest management goals include providing a vigorous uneven-aged diverse forest cover across the vast majority of MDC lands, maintaining forest cover that balances active growth and nutrient assimilation, dense filtration, temperature regulation and active reproduction, and retaining this forest cover by maintaining adequate forest regeneration across MDC lands. Additionally, the MDC/DWM will conduct any forest management activity such that the resulting benefits outweigh any potential negative impacts.

Non-forest management goals include providing a certain amount of non-forested habitat while insuring that the maintenance of these habitats has no negative impact on water quality.

The primary focus of the wildlife program on the Wachusett watershed is to minimize or eliminate adverse wildlife impacts on the drinking water supply, while protecting uncommon, rare or otherwise significant wildlife and their habitats.

The cultural resource protection goals include identifying significant cultural resources on MDC lands and preventing degradation of those resources.

V. 2001-2010 Management Plan Objectives and Methods

Contents: This section details the management objectives developed by the MDC to meet the goals specified in the previous section, and provides detail on the methods chosen to accomplish these objectives, in the area of Land Protection, Forest Management, Wildlife Management, and Protection of Cultural Resources.

Land Protection Activities

Land Acquisition

Contents: MDC has had an active land acquisition program at Wachusett since 1983. In the past decade, the MDC has acquired 10,446 acres on the Wachusett watershed (as of 6/01). This section outlines why and where MDC will continue to acquire private watershed lands.

Key points: The MDC Watershed Land Acquisition program has been funded from three bonds and a fiscal year budget allocation. The MDC is required by law to continue to purchase priority land, with an 8 million dollar per year allocation, on the active watersheds until the remaining funds in the bond are spent. These funds will have been spent by 2007. The relative sensitivity of Wachusett watershed lands has been determined by an in-depth analysis of the importance of various land criteria with respect to protecting the water quality of the Wachusett Reservoir.

Payments in-lieu of taxes (PILOT)

Contents: After land is acquired for watershed protection, the MDC/DWM is required by law to make Payments In-Lieu of Taxes (PILOT) on these properties.

Key Points: The PILOT program provides a significant benefit to the Wachusett communities. They receive the same revenue from permanently protected open space that they would have received from developed land, without the associated municipal costs of police, schools and fire services.

Land Disposition Policy

Contents: As the largest landowner within the Wachusett watershed, MDC receives requests for disposition of agency lands, often for purposes inconsistent with water supply protection.

Key Points: The MDC/DWM will consider land disposition only under exceptional circumstances. The MDC/DWM and EOEA both have land disposition policies that provide a framework to properly dispose of land provided the land is not deemed of critical importance to water supply protection.

Technical Assistance to Private Forest Landowners

Contents: This section outlines proposed plans to continue to encourage private forestland owners on the watershed to maintain their land in forest cover. This section also describes the use of conservation restriction purchases to prevent development while leaving land ownership in the current hands.

Key Points: Nearly 30,000 acres within the Wachusett watershed are "unprotected", privately owned forest. The MDC/DWM has expended funds to help private forestland owners on the watershed to complete forest management plans that, in turn, qualify them for federal cost-share assistance to conduct management activities that are desirable from a watershed protection standpoint.

Boundaries

Contents: This section outlines the maintenance approach regarding boundaries and encroachments.

Key Points: With the active land acquisition program ongoing, boundary marking is a challenge, especially when boundaries are continually being redrawn. It is extremely important for the MDC/DWM to maintain a good relationship with abutters to MDC property. By having a good relationship with abutters, it is more likely that neighboring landowners will report unauthorized uses or encroachment problems that may occur on MDC land.

Public Education

Contents: This section describes the role of the MDC Watershed Rangers and the Division's general approach to interpreting land protection.

Key Points: Watershed Rangers provide a visual presence and proactively patrol to help prevent activities that would degrade water quality. When situations occur that require law enforcement personnel, rangers communicate with the State Police and other enforcement agencies. The MDC/DWM staff engages in both formal and informal education programs to enlighten the public about the Division's land management and land protection efforts.

Fire Protection

Contents: This section includes the history of fire occurrences on the watershed and the division's capability to deal with them.

Key Points: Forest fire is a potential threat to water quality, forest health, and public safety. Legal responsibility for suppression of wildfires resides with the local fire department. MDC assists in a supporting role under the direction of the town. The improvement and maintenance of the internal road system on MDC property is key in the ability to suppress wildfires. The MDC fire policy of 1994 specifies steps necessary for the suppression of wildfires on MDC lands.

Access Roads

Contents: This section outlines the importance of an internal forest road network to provide access for watershed activities such as forest management, fire protection, water quality sampling, patrolling and policing, and emergency access. This section also discusses the state of the road system and the future challenges for access on newly acquired properties.

Key Points: There are currently nearly 60 miles of roads on MDC property in the Wachusett watershed. Only about 12 miles of these roads can be utilized throughout most of the year. With the roughly 10, 000 acres of property purchased after 1985, new roads are required to provide access. Access maintenance is controversial. Access for watershed management activities can also be access for unwelcome activities that can pose a threat to water quality. The threat of fire may increase with improved access, but fire detection and suppression activities are enhanced.
The proper maintenance of forest roads is important to insure reliable access and to minimize erosion and the resulting sedimentation of tributaries. Maintenance is variable from year to year depending largely on weather and management activities. Based on the existing staff levels and their workload and the ongoing necessity for road maintenance, a crew whose primary responsibilities will be to construct and repair forest roads should be created.

Areas with Special Management Restrictions

Contents: MDC/DWM lands at Wachusett include areas where forest management will not occur, due to potentially negative impacts on water quality or other impacts.

Key points: Areas where special management restrictions are deemed necessary fall into two general categories. These are areas where regular forest management is either impractical or may result in unacceptable impacts and areas with uncommon, rare or potentially rare resources. The MDC has identified approximately 2,000 acres of land in the Wachusett watershed that will be classified as “Areas with Special Management Restrictions”.

Management of Forested Lands

Description of Forest Management Approach for Ten Years

Contents: This section details forest management objectives for the Wachusett watershed. It reviews the influence of natural disturbance, soils/species suitability, and the current condition of regeneration. It then outlines silvicultural activities that will first provide for the establishment of regeneration and that will create, over a 60-year period, the stable multi-layered watershed protection forest that is the ultimate goal of MDC's watershed forest management operations.

Key Points: The primary goal of management of the Wachusett forest is the creation of a forest that best serves the function of the land as a producer of high quality drinking water. The forest must be vigorous and diverse in species and ages, be actively accumulating biomass, and actively regenerating. The conversion of the present even-aged forest to a forest comprised of at least three age classes necessitates that one-third of any forest stand be regenerated to a new age class followed by the creation of another age class in 20 to 30 years, a sufficient span of time to allow the various age classes to grow and become well-differentiated from each other.

Over the next 30 years, one third, or 4,000 acres of the Wachusett forest will be converted to a new age-class. In order that this age class be evenly distributed throughout MDC land and evenly spaced through time, 130 acres must be regenerated each year. Therefore, approximately 400 acres will be treated annually (a third of which is regenerated).

The management of the Wachusett forest is planned to mitigate any negative impact resulting from natural disturbances, both large and small scale. The structure of an uneven-aged forest with three age classes well distributed across the landscape, is well designed to both resist and recover from the impacts of wind, ice, and heavy snow storms. Insects and disease are a major problem only when their impacts conflict with the MDC/DWM's objective of creating and maintaining a watershed protection forest. This means that only large-scale outbreaks that threaten to alter tree species diversity or forest structure fall into this category. It is a primary goal of forest management in the Wachusett forest to encourage the development of stands of trees comprised of species well suited to the site on which they are growing.

In deciding whether regeneration is adequate for Division purposes, species composition and site suitability, the number of seedlings/saplings per acre, and the spatial distribution of regeneration across the forest will be considered. Adequate regeneration is defined as the establishment of at least 2,000 stems per acre of seedlings/saplings greater than 4.5 feet in height of a diverse species composition.

On sites where the level of regeneration is inadequate, preparatory cuttings will be prescribed. These are designed to open the canopy sufficiently to allow increased light

and heat levels at the forest floor thereby stimulating seed germination and seedling development. Once adequate regeneration is in place, it will be released systematically to give it light and space to grow. This is accomplished by harvesting a portion of the overstory from designated stands. Trees will be removed either singly or more often in groups and patches ranging from ¼ acre to two acres in size, with an average of about one acre. Occasionally there is a need to make larger removals over two acres because of species poorly suited to the site or unstable stands of damaged low-vigor trees.

Conservation Management Practices for Watershed Forest Management

Contents: The key to low impact silviculture is in on-the-ground supervision and planning. MDC has drafted detailed policies and procedures covering these activities.

Key Points: "Conservation Management Practices" refer to efforts to create resource-protecting standards for management activities. The MDC CMPs match or exceed the BMPs included in the state's Forest Cutting Practices and Wetlands Protection laws. The CMPs specify equipment, harvesting systems, and limitations around sensitive sites. Detailed timber harvesting specifications that protect the water and natural and cultural resources are outlined. MDC natural resources, environmental quality, and archaeological staff will review all silvicultural and roadwork plans as outlined in internal review policies.

Management of Non-forested MDC Lands

Contents: A percentage of MDC owned land is currently non-forested. This includes hay fields, reservoir shoreline, administrative areas, historic sites, early succession non-forested habitat, and gravel pits.

Key Points: A management plan will be written for each field the MDC/DWM intends to maintain as a field, which will address the specific goals of management, cutting/mowing schedules and procedures, control of invasive plants, filter strips width and maintenance, and other maintenance practices. The reservoir shoreline is cut on a rotational basis in order to encourage the herbaceous and shrub species to dominate the shoreline. Administrative area maintenance includes mowing of grass and the periodic maintenance of shrubbery. Historic sites will be maintained with an eye towards public interpretation of their past uses.

Management of Biodiversity

Contents: The MDC/DWM's goals for biodiversity focus on either maintaining or enhancing natural ecosystems across the watershed. The MDC/DWM recognizes that its greatest contribution to regional biodiversity is protecting large areas of land from development and maintaining most of those lands in forest cover.

Key Points: The MDC/DWM's principal goals for maintaining biodiversity are to retain most of these lands in forested condition, to identify and provide habitat for the protection of uncommon and rare flora and fauna, eliminate and prevent the spread of non-native invasive species, and provide the range of seral stages from early successional habitat through unmanaged mature forest.

Wildlife Management

Assessment of Impacts of Planned Watershed Management Activities on Wildlife

Contents: Land management activities that alter vegetation and other habitat conditions having corresponding impacts on the wildlife community in that area. Most impacts on the wildlife community will be the result of habitat changes or modifications.

Key Points: The MDC/DWM's primary long-term forest management goal is to establish and/or maintain a forest cover of diverse native tree species of many different age classes on a majority of its land holdings. Meeting this primary objective will mean wildlife communities on MDC land will be dominated by species adapted to forest conditions. Open and early successional habitat will be maintained on a relatively small percentage of the Division's land.

Conservation Management Practices for Wildlife Management

Contents: Given that the forest management program described in this plan can result in substantial changes in wildlife habitat, one of the key elements of the wildlife management program is recommending CMP's and specific actions to minimize the negative impacts and maximize the benefits of MDC's silvicultural operations, on wildlife.

Key Points: MDC will maximize benefits and minimize negative impacts on a variety of wildlife species by: observing buffer zones around rare species habitats, maintaining and encouraging a variety of mast-producing plants, providing a continuing supply of good to excellent snag and den trees and maintaining a range of sizes and types of downed woody material.

Population or Impact Control Plans

Contents: Due to their potential negative impacts on water quality, forest conditions, or infrastructure integrity, certain wildlife species require direct management attention. In this section, specific management recommendations are described for beaver, gulls, geese and muskrat.

Key Points: Beaver management issues within the Wachusett watershed can be broken down into two categories: water quality protection and damage to structures or resources. There is a consensus in the scientific community that beaver and muskrat can play an important role in the transmission of harmful pathogens to humans through water supplies. Beaver and muskrat are intensively managed by the Division when colonies are located within the defined Wachusett Pathogen Control Zone, which is a protection zone around the reservoir close to the intake. Beaver are managed outside this protection control zone on a case by case basis where water quality may be threatened. Outside of water quality issues the Division will restrict management of beavers to activities that threaten water supply infrastructure, roads or rare and uncommon plant communities. A program of harassment of gulls and geese using non-lethal means will be carried out with the goals of moving congregations of these birds away from the northern portion of the reservoir.

Active Management for Selected Wildlife Species

Contents: Most active management is focussed on providing habitat or conditions for rare or endangered species, in areas that do not affect water quality.

Key Points: Statewide, there is widespread concern about losses of habitat for species that utilize early successional habitat and closed canopy mature forest. While large-scale even-aged forest management may run counter to watershed protection objectives, there may be limited opportunities for the Division to actively manage for these habitats.

Cultural Resource Management Plan

Contents: The importance of policy with regard to cultural resources is emphasized.

Key Points: Without appropriate controls, forest management programs can be detrimental to archaeological resources. The MDC's Cultural Resource Management Program is a reviewing process that assesses the impacts that timber harvesting could have on archaeological resources should they exist on any given operation. A need for a comprehensive historic site inventory within the Wachusett watershed is identified.

VI. Research, Inventory and Monitoring Needs

Contents: Research needs are identified in the general areas of forests, forestry, wildlife and cultural resources.

Key Points: A variety of research topics are identified to aid the Division in its efforts to better manage the Wachusett watershed.

VII. Public Involvement

Contents: Public input is an important component in the effective management of MDC/DWM properties. A strategy for public involvement is outlined.

Key Points: Progress on implementation of the Wachusett land management plan will be presented as a component of an annual Wachusett public meeting. It is the intention of the agency that land management on MDC watershed properties will be an adaptive management activity.

Summary

The Wachusett Land Management Plan, outlined above, represents a comprehensive approach to the effective management of Wachusett watershed lands for the next ten years. This plan incorporates a large body of research, literature and staff expertise on a focused goal of protecting and enhancing the natural filtration capabilities of the 16,000 acres of MDC watershed land surrounding the Wachusett Reservoir. The MDC/DWM staff believe that this plan has been well researched and constructed to serve as a model for other New England water supply and conservation land managers.